REMARKS

Status of the Claims

Claims 46 – 61 remain pending and stand rejected for various grounds. Applicant has amended claims 46, 48, 50, 53, 59 and 60. As indicated below, Applicant believes this amendment is properly made after final, as it represents a narrowing of the claims to matter already encompassed by these claims ("four or more" is a subset of "three or more") and was previously contained within dependent claim 8.

Rejections based on 35 U.S.C. Section 112, first paragraph

The Office Action rejected claims 46 – 61 under 35 USC 112, as based on a disclosure that is allegedly not enabling. Specifically, the Office Action alleges that "the signaling content of the routed traces, critical or essential to the practice of the invention, but not included in the claims is not enabled by the disclosure." The Examiner asserts that the claimed method is "allegedly impossible" without knowledge of the signals being transferred on the traces.

First and foremost, the Examiner is completely wrong in his position; no knowledge of any signals is required for Applicant's invention or for an understanding of the claims. Applicant's invention is based on pairing and twisting and repairing and twisting of four or more lines across multiple segments, so that coupling is reduced. This coupling is clearly understood by anyone having any understanding of electromagnetism as it applies to electronics (i.e., anyone who has take a basic physics class), and is a length based effect; Applicant's invention is directed to rerouting conductive paths in a manner indicated by the claims so as to break up the coupling that would otherwise occur over the path length, and it has nothing whatsoever, to do with the particular signals being transmitted.

Apart from whether the Examiner is right or wrong, the Examiner does not state any legally cognizable issue with Applicant's claims, and Applicant asserts that that its claims and specification clearly are enabling. The enablement inquiry is based on whether the as-filed disclosure contains sufficient information regarding the claimed subject matter to enable one skilled in the art to make and use the invention without undue experimentation. Nowhere

does the law require description of the lowest level of minutia nor every nuance required to put each claimed feature into practice. As shown below, the enablement rejection here is improperly based on the Examiner's (incorrect) personal opinion rather than with respect to (i) the legal standards for Section 112, or (ii) what would be understood by one having ordinary skill in the relevant art.

The inventor has discovered that the effects of crosstalk due to proximity between conductors may be minimized if the conductors are arranged such that the crosstalk is distributed or equalized among the conductors over the length of a signaling link. The Applicant is not necessarily addressing all of forms of crosstalk (such as frequency-dependent crosstalk due to certain signaling content), but rather the component of crosstalk due to line-to-line proximity (claimed as a line-to-line coupling). Whether the signals are DC, AC, 50 Hz, 10 GHz, etc. is irrelevant. What is relevant is any cross-talk attributable to conductor proximity, consistent with what is claimed in claim 46.

FIG. 4 from the Applicant's specification is reproduced below. The specific embodiment of FIG. 4 shows a signaling link 40 including a transmitter (source 32) and a receiver 44, with the link having four or more conductive lines (a, b, c, d). The link is arranged in segments (expressly labeled "Seg 1" and "Seg 2"). Each segment features routing changes to reorder proximity of at least one pair of lines relative to any adjacent segment (note that lines a and d reorder their relative proximities between segments 1 and 2, as do lines b and c). Each of the lines has each of the other lines of the link as a nearest neighbor for at least a portion of the path.

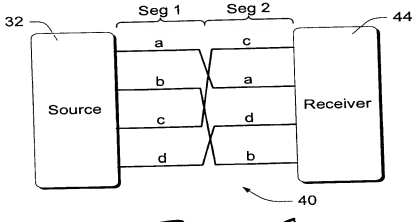


Fig. 4

Applicant invites the Examiner to review Tables 2, 3 and 4, and the accompanying descriptive text on pages 10, 12 and 14 of the originally filed application. The referenced portions of the specification provide specific examples of how arrangements in conductor proximities are carried out to equalize proximity-based crosstalk effects. The subject matter describes how to make and use the claimed subject matter in detail without undue experimentation.

It is submitted that anyone with skill in electronics would have no trouble (a) reading Applicant's claims onto the various embodiments presented by Applicant (e.g., upon FIG. 4, above), or (b) understanding what is meant by the terms "segment" and "adjacent." The Examiner's attention is again directed to the text "Seg 1" and "Seg 2" above, and it is asserted that the present claims and description clearly present no section 112 issues. Reconsideration is requested.

"Adjacent segments"

The Examiner asserts that he cannot understand the meaning of "adjacent segments," and that he is confused whether this language refers within the same plane, or "disposed anywhere about." Again, this type of rejection does not state a Section 112 issue, and Applicant's claims are neither indefinite nor unclear. Applicant submits that since the phrases "same plane" and "disposed anywhere about" are not used in the claim, and Applicant's have no intention of limiting their claims to specific embodiments that do or don't require a single plane for example. To the contrary, each of the term "adjacent" and "segment" have ordinary meanings in the English language that are very clear, and these terms are also used in very clear manner by the specification (see, e.g., FIG. 4, produced above). In one embodiment described in the specification, an "adjacent segment" is the collection of lines for a given segment immediately before or after the current segment. The lines for a given segment may be in the same plane, or in different planes. The specification describes embodiments for at least both situations. The claim language is intentionally drafted this way in order to claim a reasonable scope of protection that covers either embodiment.

"Segments"

The Office Action also states that "it is not clear how to define a segment." Applicant asserts that this position is also frivolous; to take just one example, FIG. 4 reproduced above clearly shows segments as being different part of the link path where conductors are differently twisted. Applicant asserts that the term "segment" would clearly be understood. Applicant also points out that currently, each segment is defined in claim 46 as 1) featuring a routing change; 2) to reorder proximity of at least one pair of lines relative to any adjacent segment. This language is articulated ***in the claim*** and Applicant submits that there would be no issue with one skilled in the art comprehending what is meant and covered, particularly upon resort to Applicant's specification and drawings.

"Indeterminite Points"

The Office Action also complains in paragraph 4 that the segments involve "indeterminate points," where the order of the signals is allegedly not known (see, e.g., paragraph referring to Figure 3).

Applicant is at a loss to understand how this is pertinent to Section 112, 2nd paragraph. To the extent understood by Applicant, this issue of the Examiner appears to simply be rooted in the Examiner's issues with the term "segment," addressed above. Applicant again notes that the litmus for the Section 112 enquiry is whether one skilled in the art would understand what is being claimed, and again, Applicants assert that there is clearly no legal issue here whatsoever. The terms "segment" and "adjacent" are clearly exemplified in the specification and drawings and would be readily understood by one having skill in the art. As stated in the abstract (i.e., directly as the very first descriptive text on the cover page of the publications of Applicant's specification), "[d]escribed herein is a technique for reducing the effects of crosstalk between adjacent signal lines of a data path. The data path is formed by multiple signal lines arranged adjacent each other and traversing multiple segments. The signal lines are transposed between segments in a manner that is chosen to reduce differences in interline couplings between different pairs of the signal lines."

Applicant believes that their description and elaboration on these principles are quite clear, that their claims would be clearly understood by anyone familiar with electronics, and that the language in question clearly passes Section 112 muster.

"Items allegedly not clearly defined in the specification"

The Examiner alleged in his 112, second paragraph, rejection that

> "the following items are not clearly defined in applicant's specification. Since applicant's specification gives no concrete examples or values for the claimed crosstalk equalizing, the following are not clear: "equalizing the crosstalk" (claims 46 – 61), "substantially constant" (claim 47), "substantially constant relative distance" (claim 53).

Applicant asserts that the claims in question, and the language pointed out by the Examiner, would all very clearly be understood by one having skill in the art, particularly in view of any of Applicant's embodiments (including FIG. 4, reproduced above). Respectfully, crosstalk is very well undertood by anyone having taking an electronics-oriented physics or engineering class to be an electromagnetic coupling effect that is dependent upon distance between two inductors and the length that that distance is traversed. Applicant's examples, including the example of FIG. 4 above, clearly illustrate segments each having different combinations of routing order, where the distance between conductors is substantially constant throughout the entirety of a segment. For example, again referring to FIG. 4, the distances between lines is illustrated to be constant for each segment. The purpose in reordering the lines from segment to segment is to break up the coupling effect, by interposing different lines and so diluting the crosstalk (i.e., the coupling) from one line across all lines in the link. It is respectfully submitted that anyone with skill in electronics would have no problem at all interpreting any of these terms.

Relevant portions of the disclosure (Figure 4, Tables 2, 3 and 4) are referenced above and are repleat through the specification. Any notions alleging "no concrete examples" for the claimed equalizing are simply false.

Lastly, the Examiner alleges that the claims do not recite any specific logic or steps in how the trace's relative positions cancel or reduce any crosstalk . Contrary to the Examiner's opinion in this regard, the Applicant's claims recite a very specific way (arranging segments of lines of a signaling link in a specific way) to reduce the effects of proximity-based

crosstalk. As introduced by the abstract, "[d]escribed herein is a technique for reducing the effects of crosstalk between adjacent signal lines of a data path. The data path is formed by multiple signal lines arranged adjacent each other and traversing multiple segments. The signal lines are transposed between segments in a manner that is chosen to reduce differences in interline couplings between different pairs of the signal lines." This concept is underscored repeatedly in Applicant's specification, and it is respectfully submitted that Applicant's specification very clearly explains how the line twisting patterns and line reordering helps break up the effects of crosstalk, i.e., is stated repeatedly and throughout Applicant's specification (see, in addition to the abstract for example, paragraph 17 of Applicant's published specification).

Rejections based on 35 USC Section 103

The Office Action included a cryptic rejection to what appears to be claims 46 – 61 (claim 45 is identified, then separate claims identified in separate clauses) under 35 USC 103 as being unpatentable over Shimazaki et al. (US Publication No. 20020041510).

According to the Office Action (quoted)

> "Shimazaki discloses that it is known to cross-cross trace segments in order to reduce cross-talk between traces (paragraphs 18, 78), but does not specify equalizing the crosstalk from a group of traces to a selected trace by using the known routing method. … It would have been obvious to one skilled in the art at the time of this invention, to minimize the crosstalk as needed for the particular application. The examiner notes that, in a particular group of traces, when all of the interfering traces are carrying the same signal, the minimum crosstalk for the minimized-crosstalk trace will be an equal amount from each of the interfering traces. Further, it would have been obvious to minimize the crosstalk effect from said minimized-crosstalk trace back to each of the interfering traces. The optimum configuration for that situation would also be to equalize the crosstalk between one trace and each of the other traces."

As understood by Applicant, the Examiner appears to be contending that Shimazaki shows a single twisted line pair (within an integrated circuit); the Examiner acknowledges

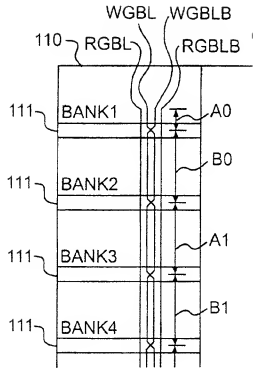
that there are no teachings related to crosstalk in Shimazaki et al., but then reasons without any evidentiary or other basis whatsoever that the twisting of different conductors and retwisting across different segments would all have for some reason been obvious.

This rejection clearly fails any of the legal standards articulated for an obviousness rejection. In particular, Applicant's claims recite four or more conductors where ***each line*** has each of the other lines of the link as a nearest neighbor for at least a portion of the path. This limitation is effective in every one of Applicant's claims, and is not show by any of the cited art. Applicant also asserts that, as admitted by the Examiner, Shimazaki et al. doesn't even provide any teachings directed to crosstalk. The Examiner has not offered any reasoning as to why these one skilled in the art would regard the invention as obvious, notwithstanding the failure of the cited art to disclose these limitations.

To the contrary, Applicant asserts that the Examiner has not met ***his burden*** in justifying an obviousness conclusion given these differences. What is more, given the failure of the art relied upon by the Examiner to address crosstalk or techniques for reducing coupling within a four-or-more line bus, the present invention clearly is patentable over the cited art, i.e., the art relied upon by the Examiner is not directed to the problem addressed by Applicant, does not advocate any mechanism or means for solving the problem addressed by Applicant, and there is nothing in the art relied upon by the Examiner to bridge that gap or otherwise direct one how to arrive at Applicant's solution.

Applicant notes that there are other differences between the present invention and the cited art as well. The Shimazaki et al. publication relates to an embedded memory device that serves as a cache for a microprocessor. All of the circuitry described and shown in the reference resides in a single integrated circuit. While the Office Action alleges that Shimazaki discloses a trace, the reality is that not a single trace is disclosed. There are no signaling links, transmitters, nor receivers disclosed in Shimazaki.

As shown below, Shimazaki's Figure 13 shows four bit lines disposed inside the core of a memory integrated circuit: RGBL, WGBL, WGBLB and RGBLB, with the WGBL and WGBLB bit lines periodically twisted at the segment boundaries for segments B0, A1, B1, etc. Paths RGBL and RGBLB are shown as remaining apart a consistent distance, and not becoming nearest neighbors along any of the segments (A0, B0, A1, and B1).



Applicant submits also that Shimazaki et al. is not analogous art. The claimed subject matter of claim 46 relates to the field of signaling links, and passive ways to route signals to minimize the effects of line-to-line crosstalk. Shimazaki et al. relates to active circuitry on a single integrated circuit chip with bit-line routing to minimize interference between read and write paths.

Clearly, Shimazaki et al. calls for reordering proximity of only 2 wires. Each line, as a result, does not have ***each*** of the other lines as a nearest neighbor for at least one of the portions of the path, as required by the claims.

Accordingly, based upon the differences between the claims at issue and the cited art, it is respectfully submitted that the obviousness rejection cannot be maintained, and reconsideration is requested.

The Present Amendment

Applicant has amended each of the independent claim to speak of a link having four or more conductive lines. This amendment (a) was a necessary subset of the invention as

originally presented (i.e., four or more is a subset of three or more) and (b) writes into the independent claims language previously presented in dependent claim 8. Accordingly, the present amendment is properly made after final as a matter of right, and Applicant respectfully requests entry.

In Conclusion

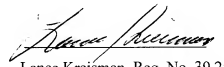
Applicant respectfully submits that all pending claims are in condition for allowance. If a telephone interview would be helpful in any way, the examiner is invited to call the undersigned attorney. Should the claims remain in a non-allowable state via an Advisory Action, Applicant immediately requests an interview with both the Examiner and his Supervisor.

Authorization is hereby given to charge deposit account 501914 for any fee deficiency associated with this Amendment.

Respectfully submitted,

MAHAMEDI PARADICE KREISMAN LLP

Date: October 21, 2009



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